

REMARKS

Petition for Extension of Time Under 37 CFR 1.136(a)

It is hereby requested that the term to respond to the Examiner's Action of March 10, 2009 be extended two months, from June 10, 2009 to August 10, 2009.

The Commissioner is hereby authorized to charge the RCE filing fee, the extension fee, and any additional fees associated with this communication to Deposit Account No. 50-4364.

In the Office Action, the Examiner indicated that claims 16, 18, and 21 through 30 are pending in the application and the Examiner rejected all claims. By this amendment, applicant has amended claim 1, and added new claims 31 and 32, which correspond to cancelled claims 19 and 20, respectively.

A. Support for the amendment to the independent Claim

The new Claim 1 text:

"the wave base being the maximum depth at which a wave's passage causes significant water motion"

has been accepted by the examiner as the appropriate definition in the previous Office Action.

The new Claim 1 text:

"tension moored to resist heaving in response to wave action such that when the device is operating in resonance a passing wave has no substantial effect on the absolute vertical position of the device, and causes the level of water in each chamber to rise relative to the device."

finds explicit support from paragraph 25 of the published application:

"Essentially, the advent of a wave crest at the side of the wave energy device is a temporary increase in the water level in the vicinity of the device 10.....

therefore producing the result that the wave action has little effect on absolute vertical position of the wave energy device 10.”

And at paragraph 29:

“As a wave crest approaches the device 10, the water level 32 within chamber 26 rises When the crest of the wave has passed by, the water level 32 within the chamber 26 drops..”

Rejections under 35 U.S.C. §§102 and 103

On page 3 of the Office Action, the Examiner rejected claims 16, 18, 21, 23-24, and 26-29 under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,770,893 to Youlton.

Also on page 3, the Examiner rejected claims 16, 18, 21, 23-24, and 26-29 under 35 U.S.C. §102 (b) as being anticipated by U.S. Patent No. 4,123,185 to Hagen et al.

On page 4 of the Office Action, the Examiner rejected claims 22, 25, and 30 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,770,893 to Youlton.

Applicant notes he Examiner’s comments about Figure 1 and references to the term “taut.” Applicant points out to the Examiner that Figure 5 illustrates an alternative embodiment in which the wave energy device 10 is “restrained by taut tethers 24a.” See paragraph [0031] of the published application.

B. Meaning of the term ‘wave base’

In applicant’s previous response, applicant explained that the term ‘wave base’ is in fact a term of art that refers to the maximum depth **at which a water wave's passage causes significant water motion**. See http://en.wikipedia.org/wiki/Wave_base

The Examiner has accepted this definition, but abbreviated it as follows:

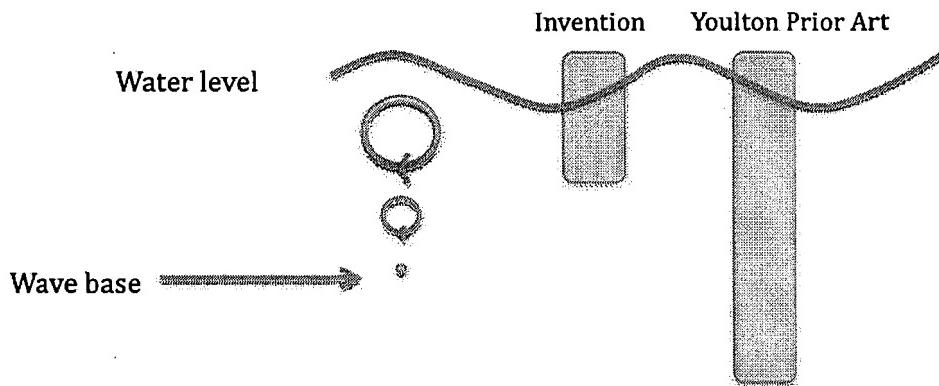
“Applicant argued ‘wave base’ is the maximum depth”.

The Examiner has unfortunately ignored the remaining and critical part of the definition, which is shown in bold above. The Examiner then argues that the bottom of the Youlton device “is always above the maximum depth” and so Youlton must disclose the claim 1 feature of “each chamber being open to water above the wave base”.

The Examiner is in error for two reasons. First, it seems as though the Examiner is equating ‘maximum depth’ to the depth of the water down to the seabed. That is clearly not what the definition means. For example, a typical 2 foot wave in 50 feet of water has a wave base of about 10 feet; anyone or anything deeper than 10 feet below the surface feels no wave motion as the wave passes above.

Secondly, Youlton explicitly teaches that the tubes in its design are “generally disposed below the effective wave base” (See Abstract). So Youlton explicitly teaches the exact **opposite** of what is now claimed. The tubes in Applicant’s invention are **above** the effective wave base.

A picture may help clarify the distinction:



In the above picture, the motion of the subsea water particles associated with a passing wave is shown as a circle, as is well known to those skilled in the art; the size of the circle represents the magnitude of the water motion. At the wave base, the water motion and subsequent pressure (head) fluctuation is negligible. The rectangles in the picture represent the water/air chambers or tubes in the claimed invention and in the prior art. The sea bed is not shown; if this were drawn to scale it would be far off the bottom of the page.

The illustration shows how the claimed invention is completely different from Youlton. In the claimed invention, when operating in resonance wave conditions to generate energy, the bottom of the chamber is above the wave base, as illustrated by the rectangle on the left. But in Youlton (according to the Youlton abstract), the bottom of the chamber is below the wave base in similar resonance conditions, as illustrated by the rectangle on the right. The example of resonance wave conditions is used because it is in those conditions that the claimed invention and the Youlton design operate optimally. In very low wave conditions, the effective wave base may be not very deep at all, so that both the bottom of the tubes in the present invention and Youlton are below the wave base. Hence, it is necessary to reference the position of the bottom of the chambers in wave conditions that can lead to resonance in order to fully distinguish the invention over Youlton.

In summary, the claimed invention is patentably distinct over Youlton because Claim 1 requires that the lower end of each chamber is open to water **above** the wave base when operating in resonance to generate energy, the wave base being the maximum depth at which a wave's passage causes significant water motion. In Youlton, each chamber has to be open to

water **below** the wave base when operating in resonance to generate energy, i.e., Youlton is the opposite of the claimed invention.

C. Youlton must move up and down with each passing wave

Claim 1 now requires that the device is tension moored to resist heaving in response to wave action **such that, when operating in resonance, a passing wave has no substantial effect on the absolute vertical position of the device, and causes the level of water in each chamber to rise relative to the device.**

This is again the opposite of what happens in Youlton. Applicant has, in its previous response, explained why Youlton must in fact heave up and down when waves pass it. Applicant believe that the examiner has not disagreed with this analysis.

Applicant reproduces below, the argument:

Youlton discloses a wave energy device with tubes that are “generally disposed **below** the effective wave base” (See Abstract). Because the bottom of the tubes are below the effective wave base, there is no pressure head at the base of a tube when a wave is passing the device. When a wave passes the device, the buoy heaves upwards, but the water column in a tube does not rise in absolute terms because there is no pressure head at the tube base. Because the buoy heaves *upward*, the water column in the tube moves *down* relative to the buoy. It is this relative movement of the water column in each tube that drives the air movement in each tube. But it requires the buoy to heave.

In summary, the claimed invention is patentably distinct over Youlton because Claim 1 requires that a passing wave does not substantially affect the absolute vertical position of the device. In Youlton, a passing wave must make the Youlton device move upwards substantially. So it is the **opposite** of what is claimed. Further, Claim 1 requires that a passing wave causes the level of water in each chamber to **rise** relative to the device. In Youlton, a passing wave causes

the level of water in each chamber to **fall** relative to the device. So it is again the **opposite** of what is claimed.

D. Hagen

Hagen is completely silent on the Claim 1 requirement for its chambers to be open to water **above the wave base** when operating in resonance. It cannot therefore be a basis for a §102 rejection. In fact, because Hagen is meant to be a breakwater for ships, it is likely to be a very large structure indeed and hence its chambers are more likely than not to be open at a depth significantly **deeper** than the wave base.

Further, Hagen is completely silent in relation to the Claim 1 feature: “tension moored to resist heaving in response to wave action such that when the device is operating in resonance a passing wave has no substantial effect on the absolute vertical position of the device, but instead causes the level of water in each chamber to rise relative to the device.” The platform in Hagen is said to be a ‘floating platform’. It is therefore very likely that it will move **upwards** as a wave passes it. The cables 15 in Figure 2 of Hagen would clearly offer no resistance to that movement of the platform.

Hagen also lacks relevance because the varying chamber draughts in Hagen tune the device to extract energy from different wave sizes.

“The wave energy collecting cells vary in depth for various wave *sizes*” Hagen col. 2, lines 23 – 24.

The claimed invention, however, requires varying chamber size to extract energy from different wave **frequencies**. Wave size is of course different from wave frequency. The examiner has not objected to this position and Applicant assumes that the Examiner accepts it as a valid point of difference.

Conclusion

The present invention is not taught or suggested by the prior art. Accordingly, the Examiner is respectfully requested to reconsider and withdraw the rejection of the claims. An early Notice of Allowance is earnestly solicited.

The Commissioner is hereby authorized to charge the extension fee and any additional fees associated with this communication to applicant's Deposit Account No. 50-4364.

Respectfully submitted

August 5, 2009

Date

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